



JPDO Paper

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Working Group

Next Generation Air Transportation System International Strategy

The Next Generation Air Transportation System (NextGen) International Strategy will communicate the JPDO's approach for achieving globally interoperable air transportation systems in collaboration with international stakeholders. This document identifies seven key elements describing strategic objectives that will translate into goals and commitments for JPDO partner departments and agencies. It is intended to guide the United States in a deliberate, collaborative effort towards harmonizing NextGen globally. In addition, this strategy is intended to support agency executives by highlighting areas within NextGen programs affecting resources.

Mission Statement: Through global harmonization, ensure the interoperability of NextGen systems and procedures that will transform air transportation services, increase capacity and efficiency, improve safety and security, and promote environmental stewardship.



NextGen
Next Generation Air Transportation System
Joint Planning and Development Office

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Preface

Signed on December 12, 2003, Vision 100—Century of Aviation Reauthorization Act (Public Law 108-176) directs the Secretary of Transportation to establish in the Federal Aviation Administration (FAA) a Joint Planning and Development Office (JPDO). This International Strategy document was developed cooperatively between the FAA, the Department of Transportation (DOT), the Department of Defense (DoD), the Department of Commerce (DOC), the Department of Homeland Security (DHS), the National Aeronautics and Space Administration (NASA), and the aviation industry.

The goals established by Public Law 108-176 indicate that NextGen shall:

- o Improve the level of safety, security, efficiency, quality, and affordability of the National Airspace System (NAS) and aviation services
- o Integrate data to enable situational awareness and seamless global operations
- o Encourage substantial growth in domestic and international transportation, and anticipate and accommodate continuing technology upgrades and advances

The JPDO understands and recognizes the necessity to design and develop an air transportation system-of-systems that achieves interoperability by seamlessly and transparently bridging political or other boundaries between nation states, air navigation service providers (civil/military), aircraft operators, and other airspace users. Coordination and collaboration on policy, system standards, and operational procedures across international borders will promote seamless global harmonization. Coordination of avionics capabilities and equipage milestones will create operational benefits. This collaborative effort will occur between the NextGen partner departments and agencies, and their respective system counterparts such as the International Civil Aviation Organization (ICAO), aviation advisory organizations, Civil Aviation Authorities (CAA), air navigation service providers (ANSPs), aircraft operators, and other stakeholders.

The NextGen International Strategy will communicate the JPDO approach for achieving globally interoperable air transportation systems in collaboration with international stakeholders. This document identifies seven key elements which describe strategic objectives that will translate into goals and commitments for JPDO partner departments and agencies. It is also intended to guide the United States in a deliberate, collaborative effort towards NextGen global harmonization. In addition, this strategy is available to agency executives who are interested in highlighting areas within the NextGen program affecting resources.

I would like to thank the JPDO and industry stakeholders for their hard work and focus as we move forward to refine a consolidated and integrated international strategy for successful NextGen global harmonization.

Sincerely,

Carey J. Fagan
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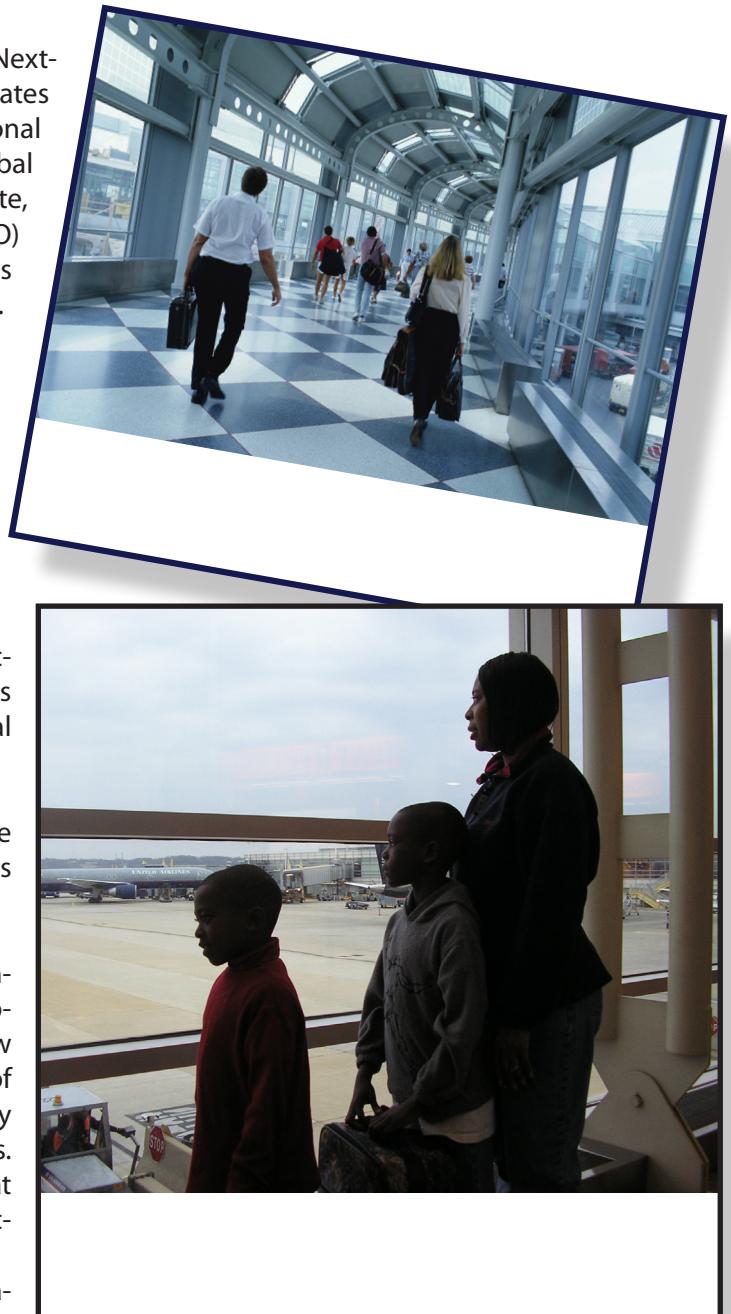
Introduction

The Next Generation Air Transportation System (NextGen) is a comprehensive effort between the United States Government and industry to modernize the National Airspace System (NAS) to be consistent with global growth demands through 2025 and beyond. To date, the Joint Planning and Development Office (JPDO) has established goals and documented commitments to deliver a modernized air transportation system. Moving forward, international integration of NextGen concepts is required to maximize operational benefits. NextGen will transform global air transportation with new and enhanced technologies, procedures, processes, and services such as performance-based navigation, improved security measures, net-centric information-sharing, Safety Management Systems (SMS), and trajectory-based operations. These transformations will meet the capacity and efficiency needs of a new era, while further enhancing safety and security, providing seamless operations across borders, and promoting global environmental stewardship.

The efficiencies and operational improvements to be brought about by NextGen hinge on the key concepts of global harmonization and interoperability:

Harmonization necessitates the development of common international documentation for technical and operating standards, procedures, and policy in using new systems, technologies, and processes. Harmonization of policies and guidance materials provides conformity and consistency in service provision to system users. Harmonization affords stakeholders confidence that compliance with one authority's policies results in recognition among other authorities.

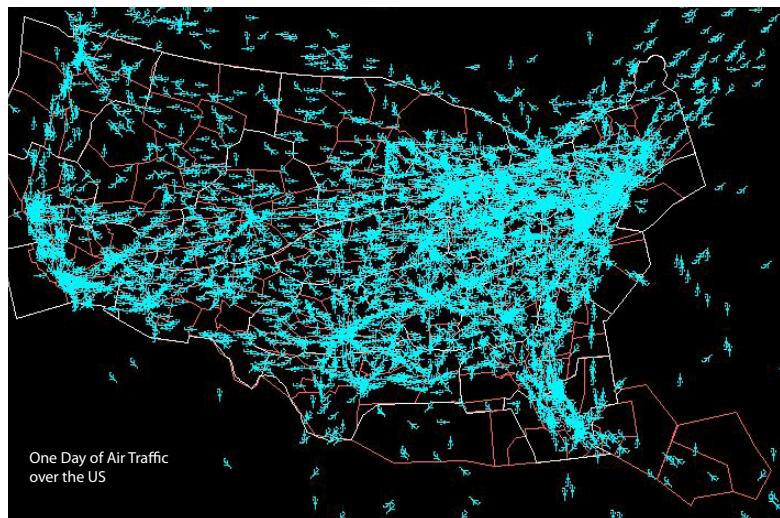
Interoperability refers to the seamless flow of information and operations across boundaries. It requires that all systems meet a common requirements set and be accepted by agencies worldwide. Interoperability is the result of successful harmonization.



NextGen global harmonization and interoperability requires successfully overcoming many challenges, which include the following:

- o The U.S. Flight Information Region (FIR) is adjacent to 29 foreign FIRs
- o Many U.S. aircraft operate internationally
- o Many foreign aircraft operate to and from the U.S.
- o The U.S. military's aircraft operate globally at transient and deployed locations
- o The global aviation industry uses a wide variety of aircraft and equipage
- o Aircraft and aircraft components are manufactured globally

Using current systems, delays are expected to rise as traffic volumes increase. It is evident that there is a need to modernize these systems; however, system users and service providers will upgrade or enhance their respective operational capabilities at different rates. The timing disparity among modernization programs must be thoroughly explored and addressed in planning so that the harmonization effort is



not further complicated. Stakeholders have grave concerns over equipage costs and return on investments for NextGen related systems. These costs impact domestic and international operations. The design, development, and deployment of modern systems should be harmonized internationally in such a way as to garner the greatest benefit to the system users. In addition, stakeholders need assurances that NextGen will provide global interoperability and harmonization to justify financial commitments for NextGen systems and equipment.

Successful interoperability requires the support, cooperation, and full partnership of system users, service providers, and industry to maximize potential. Harmonization calls for the close collaboration among service providers, aircraft operators, the International Civil Aviation Organization (ICAO), advisory committees, Civil Aviation Authority (CAA) regulatory bodies, and JPDO partner departments and agencies to maximize system interoperability while recognizing regional differences. Equally important, efforts should be made to minimize differing regulatory mandates. Fully realized, NextGen interoperability and harmonization efforts create the ability to exchange and use information across a large and complex network of systems crossing international borders. It will foster a harmonized service provision, in accordance with harmonized safety standards such as Safety Management System (SMS). NextGen interoperability and harmonization efforts will also provide common operating procedures and standards along with compatible implementation activities.



The NextGen International Strategy aims to meet these challenges and enhance the international air transportation system. This strategy promotes fundamental elements that will increase success in attaining a globally interoperable and harmonized system. This strategy will be applied to the individual work programs of the JPDO partner departments and agencies. It will help bring to light program convergences and avoid duplications while seeking to ensure cross-agency interdependent activities are identified. In addition, the success of the strategy will depend on the ability of NextGen planners to focus on the right activities and dedicate the necessary resources to accomplish them.

Strategy

There are seven key elements that define the NextGen International Strategy. These elements are to be applied to the individual organizations' work plans on a continual basis.

1. Identify and prioritize international harmonization and interoperability activities
2. Partner with essential international organizations and agencies
3. Leverage industry's global reach to facilitate interoperability of technology and harmonization of procedures
4. Promote global operational, technical, and procedural standards
5. Promote education and knowledge sharing of NextGen activities
6. Facilitate international NextGen collaborative activities
7. Encourage civil/military cooperation on a national, regional, and global scale

Identify and prioritize international harmonization and interoperability activities

NextGen will deliver improved services and resulting operational benefits in all areas of aviation to its stakeholders. Achieving these goals requires prioritization and synchronization of activities to deliver capabilities on schedule and at acceptable costs. An important first step is to differentiate what activities need to be harmonized, and what can occur independently. System deployment schedules must be coordinated among system users, service providers, and industry. The systems should provide incremental improvements that build upon each other in a logical manner. New systems, processes, standards, and capabilities should be developed and delivered with internationally harmonized procedures and operating practices. The deployment of new technologies and operational capabilities should occur simultaneously with global partners to help maximize benefits. New technologies must be deployed in such a way that they are assimilated into the global system with minimal impact. In assessing impact, consideration must be given to areas such as production, equipage, cost, training, safety, and maintenance.



Partner with essential international organizations and agencies

Collaboration must occur where it will produce the greatest benefit. Different states are maturing their strategies and systems at a rate relative to their requirements. Certain states and organizations that stand out as leaders in advanced aviation technologies will be obvious targets for collaboration. Along with the U.S., Europe is recognized as a world leader in advancing the aviation industry through their Single European Sky ATM Research (SESAR) program. Partnering with the European Commission on the SESAR initiative is key for mutual success. Coordination with other air navigation service providers (ANSPs), due to geographical location and traffic densities, is crucial for success. Partnership with these providers has occurred with Australia, Canada, Japan, Mexico, and China. Additional partnerships will be necessary for a globally interoperable system.



In addition to ANSPs, it will also be key to form strong partnerships with targeted state, regional, and international organizations and agencies that are engaged in future air transportation systems development. These alliances will occur in areas such as international security and defense (e.g., air traffic management security, interoperable systems for passport control, passenger and baggage security screening, and border protection measures). Environmental issues related to aviation will continue to be addressed in ICAO through its committee on aviation environmental protection. Alliances and partnerships will be beneficial in many areas such as commerce, space flight, safety management, spectrum allocations, weather and aeronautical information exchange models, and others.

Leverage industry's global reach to facilitate interoperability of technology and harmonization of procedures

Private industry plays an integral part in the success of NextGen. The development of the tools and technologies required to move into the next generation of air transportation will be generated by industry partners both in the U.S. and abroad. Global harmonization is accomplished when these NextGen tools, technologies, and requisite procedures proliferate around the globe as a result of international commerce. Global sharing of NextGen industry products should be supported and promoted. Areas must be identified where industry is best suited to take the lead in interoperability and harmonization efforts. Additionally, when appropriate, industry will be integrated into the process to assist in the development of technical standards and demonstration programs.



Promote global operational, technical, and procedural standards

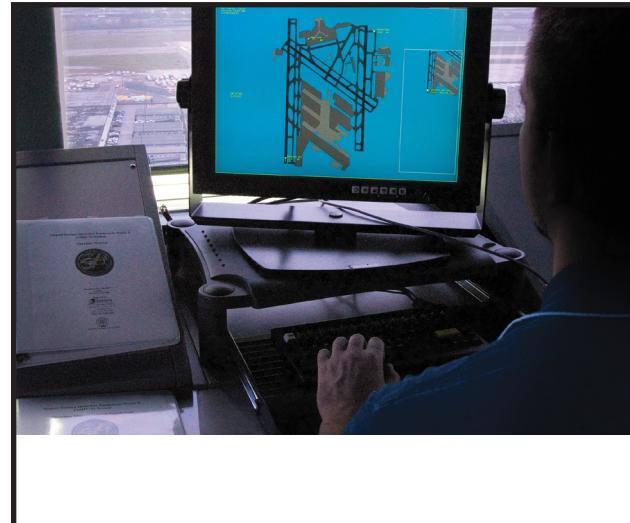
NextGen encompasses all areas of aviation. To harmonize our NextGen capabilities worldwide, it is imperative to first identify those areas requiring globally accepted standards. This will require that JPDO partner departments and agencies engage with aviation experts such as Aeronautical Radio Incorporated (ARINC), European Organization for Civil Aviation Equipment (EUROCAE), RTCA Inc., Civil Air Navigation Service Organizations (CANSO), EUROCONTROL, Society of Automotive Engineers (SAE), ICAO, and others to develop globally accepted technical requirements. Global standards may be relevant in the following areas:

- o Communication, navigation, and surveillance
- o Air traffic control and flow management procedures
- o Security and defense measures
- o Surface and airborne operating procedures
- o Safety Management Systems
- o Situation displays
- o Avionics
- o Environment
- o Weather integrated information, forecasting, and reporting
- o Space vehicle operations in controlled airspace
- o Unmanned Aircraft Systems (UAS)
- o Data access and exchange

For areas requiring ICAO Standards and Recommended Practices (SARPs), stakeholders must make every effort to collaborate proactively for timely implementation. Time lags of international standardization processes could impact progression of NextGen. Efforts should be made to identify possible time lags, and determine appropriate action to avoid delays of NextGen. Other areas may require less formal guidance material and agreed upon operating practices.

Promote education and knowledge sharing of NextGen activities

To be successful, ICAO member States will need to collectively support the efforts of global harmonization, and many States will look to the U.S. for leadership in the area of NextGen technologies. Traditional and virtual communities are vehicles to share U.S. concepts and promote U.S. technologies with international partners. Fostering avenues for knowledge sharing within the international aviation community will provide a work environment where stakeholders can collectively reflect and create knowledge, and more readily harmonize worldwide equipage and procedural standards. The JPDO partner agencies and members of industry have ample opportunities to promote NextGen globally at agency and industry supported venues. The U.S. must leverage these opportunities with



a focus towards promoting NextGen worldwide. Readily available communications media for NextGen, such as written briefings and graphic presentations, will be required and should be customized for various international audiences. To ensure agency representatives deliver a consistent message, a library of briefings and handouts will be developed. In addition, the U.S. will work with international partners on technical training in NextGen technologies and procedures through appropriate channels.

Facilitate international NextGen collaborative activities

NextGen is a multi-year effort defined by numerous programs involving government agencies, industry, and system users. To ensure a consistent and unified message by the U.S. Government to the international community, it is important for JPDO partner departments and agencies to coordinate aviation activities. This will maximize interagency visibility and synergistic value when cooperating with international partners. In support of this effort, the JPDO Board will be made aware of agency international agreements concerning NextGen activities.

To realize the benefits of an international global harmonization strategy, the JPDO must establish a process for tracking progress of international activities and interdependent actions affecting NextGen milestones. This systematic tracking of efforts at all levels will facilitate the identification of gaps in the harmonization process.

Encourage civil/military cooperation on a national, regional, and global scale

Within the United States, civil/military cooperation and coordination on a national level in the aviation transportation system is not only accepted but expected. This continuous relationship has served to provide bi-directional education to civil and military communities on each other's specific requirements, and allowed for a more unified, effective planning and execution effort. However, this relationship is limited or nonexistent in many parts of the world. Without close national, regional, and global coordination between civil and military aviation organizations, global harmonization efforts will be constrained from achieving its full potential. Divergent interests within an individual nation or region, if not adequately addressed, could negatively impact the global harmonization effort. Civil/military harmonization efforts need diplomatic support and assistance to help establish a common understanding between the stakeholders involved. The synchronization effort must consider political, procedural and technical issues to enable a global interoperable world aviation system.

Conclusion

This NextGen International Strategy communicates the JPDO approach for achieving globally interoperable air transportation systems. The seven key elements which describe strategic objectives are intended to translate into goals and commitments to be owned by JPDO partner agencies and industry stakeholders. Ultimately, the success of this strategy will be measured by the results that can be systematically tracked and reported at international forums dedicated to discourse on global harmonization and interoperability.

